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FOUR PUZZLING NEW SPECIES OF MECOPTERA

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Abstract.—New genus ***Eremobittacus*** and new species ***Eremobittacus spinulatus*** (Mexico), ***Nannobittacus dactyliferus*** (Eucador), ***Panorpa sentosa,*** and ***Panorpa truncata*** (Mexico) are described and illustrated. The unusual characteristics of each species are discussed.

Key Words: Mecoptera, Panorpidae, Bittacidae

For several years, the species discussed here have remained unnamed and undescribed in the hope that additional specimens would be found, of these or closely related species, that would help to clarify their relationships with others in their respective genera. This hope, however, has not been realized. Each of the four species possesses a striking peculiarity that sets it uncommonly far apart from its supposedly nearest relatives. In one case, it was not possible to assign the species to any existing genus. The unique and puzzling structural characters are discussed following the description of the respective species.

Holotypes, allotypes and most paratypes are in the Snow Entomological Collection, Natural History Museum, University of Kansas, Lawrence, Kansas.

Venational abbreviations, other than the usual ones of the Comstock-Needham system, are as follows: Scv—subcostal cross-vein from Sc to R, ORs—origin of Rs from R, FRs—first fork of Rs, Pcv—pterostigmal cross-vein(s), OM—origin of M from Cu_1, FM—first fork of M.

Eremobittacus Byers, New Genus

Similar in many characteristics to *Bittacus* but differing in (1) length of hind basitarsus compared to that of fourth tarsomere, (2) wing venation, (3) surface sculpture and (4) body colors. In hind tarsus, basal segment approximately same length as fourth and shorter than second and third together. Cross-veins between R_4 and M_4 in transverse-diagonal alignment; these outer three ranks of cross-veins crossing five cells and conspicuously bordered by clouding darker than wing membrane generally. Hairs on most body surfaces very short and arising from apices of microscopic spinules (Fig. 7), but spinules much more numerous than those bearing hairs (especially noticeable on generally glossy hind femora). Colors contrasting, particularly on legs (Fig. 6); not seen in other regional Bittacidae.

By existing keys, *Eremobittacus* will be identified as the Australian *Harpobittacus* because of the relative lengths of the hind tarsomeres. Transverse-diagonal alignment of most major cross-veins into three ranks is not unique (occurs rarely in *Bittacus*) but is conspicuous in *Eremobittacus* due to dark coloring along these cross-veins. Presence on much of the body surface of tiny subconical denticles, or spinules (Fig. 7), has not been seen elsewhere in the Bittacidae. Mexican species of *Bittacus* are rather uniformly brown or yellowish brown and

do not have the contrasting coloration as in *Eremobittacus.*

Type species: Eremobittacus spinulatus, new species.

Etymology: The generic name is from the Greek words *eremos,* solitary or lonely, and its derivative *eremia,* desert or wilderness, plus *Bittacus.* For years known only from the single specimen described below, despite efforts to obtain additional representatives, *Eremobittacus* is indeed solitary or alone. The habitat, when I visited it in 1969 and 1972, was semi-desert, along a dry stream bed bordered by sparse, thorny acacia-like trees and herbaceous plants 1–3 feet high shaded by these trees; the soil was dry, stony and mostly bare between the larger plants. (While the search for additional *Eremobittacus* was unsuccessful on both visits, a still undescribed species of *Bittacus* was found, in 1972, in the herbaceous vegetation.)

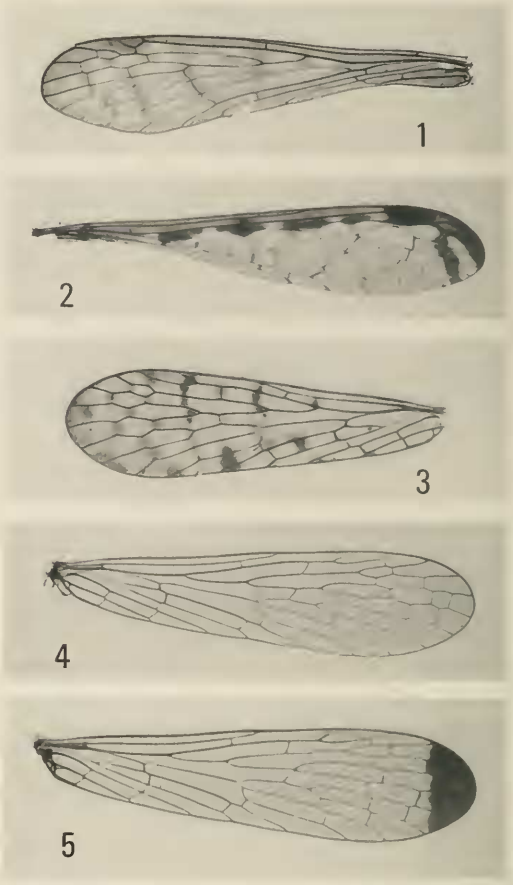
Eremobittacus spinulatus Byers, New Species
(Figs. 1, 6, 7–12)

Description.—Based on 1 ♂, pinned.

Head: Dorsal surface dark yellowish brown with extremely short, slender, yellowish hairs at each side above eyes, each hair arising from a microscopic, subconical cuticular spinule (cf. Fig. 7); broad median zone behind ocellar triangle without hairs (spinules only). Ocellar triangle dark brownish black with two black setae above median ocellus; lateral ocelli twice diameter of median ocellus. Rostrum dark yellowish brown, genae dark brown; mouthparts amber brown with curved, yellow setae on tips of maxillae. Antenna dark yellowish brown with short yellowish hairs; approximately 20 flagellomeres (separations indistinct beyond 12 or 13); length about 6 mm.

Thorax: Pronotum with three rounded, transverse ridges, unevenly dark yellowish brown, darkest laterally where ridges converge; anterior ridge with low prominence at each side of wide, shallow, median emargination, each prominence bearing stout, black setae (on holotype, 2 on left side, 3 on right). Mesonotum and metanotum sordid dark yellowish brown with numerous tiny spinules in broad median band, short yellowish hairs on each scutellum. Pleural surfaces, coxae and mera shiny black except brownish black on propleuron and close beneath wing attachments, spinulose, with sparse, pale setae. Three or four thick, black setae on outer surface of hind coxa; two smaller black setae on each epimeron.

Fore femur yellowish brown, not swollen, with abundant spinules and interrupted row of black setae on anterior (4 setae),



Figs. 1–5. Wings of new species of Mecoptera. 1, Left fore wing of *Eremobittacus spinulatus,* male holotype. 2, Right fore wing of *Nannobittacus dactyliferus,* male paratype. 3, Left fore wing of *Panorpa sentosa,* male paratype. 4–5, Right fore wings of *Panorpa truncata,* male paratype (4) and female paratype (5).

Fig. 6. *Eremobittacus spinulatus,* male holotype, left lateral aspect.

dorsal (3–4) and posterior (7) sides; middle femur resembling fore femur but with 9, 7 and 12 setae in uneven rows. Hind femur mostly black, dark yellowish brown near outer end, greatly swollen in basal two-thirds (Fig. 8), abundantly spinulose (Fig. 7), with some spinules bearing short, dark hairs; black setae on basal one-third, sparse (2–4) on anterior (outer) surface, sparse dorsally, more numerous (14–16) in irregular row on posterior surface. Tibiae yellowish brown with scattered black setae; spinules in encircling rows, few bearing short, pale hairs; tibial spurs long, slender. Basitarsus of fore leg subequal in length to second and third tarsomeres together, much longer than fourth; that of middle leg slightly longer than second and third together. Hind basitarsus approximately same length as long, thick fourth tarsomere, shorter than second and third together.

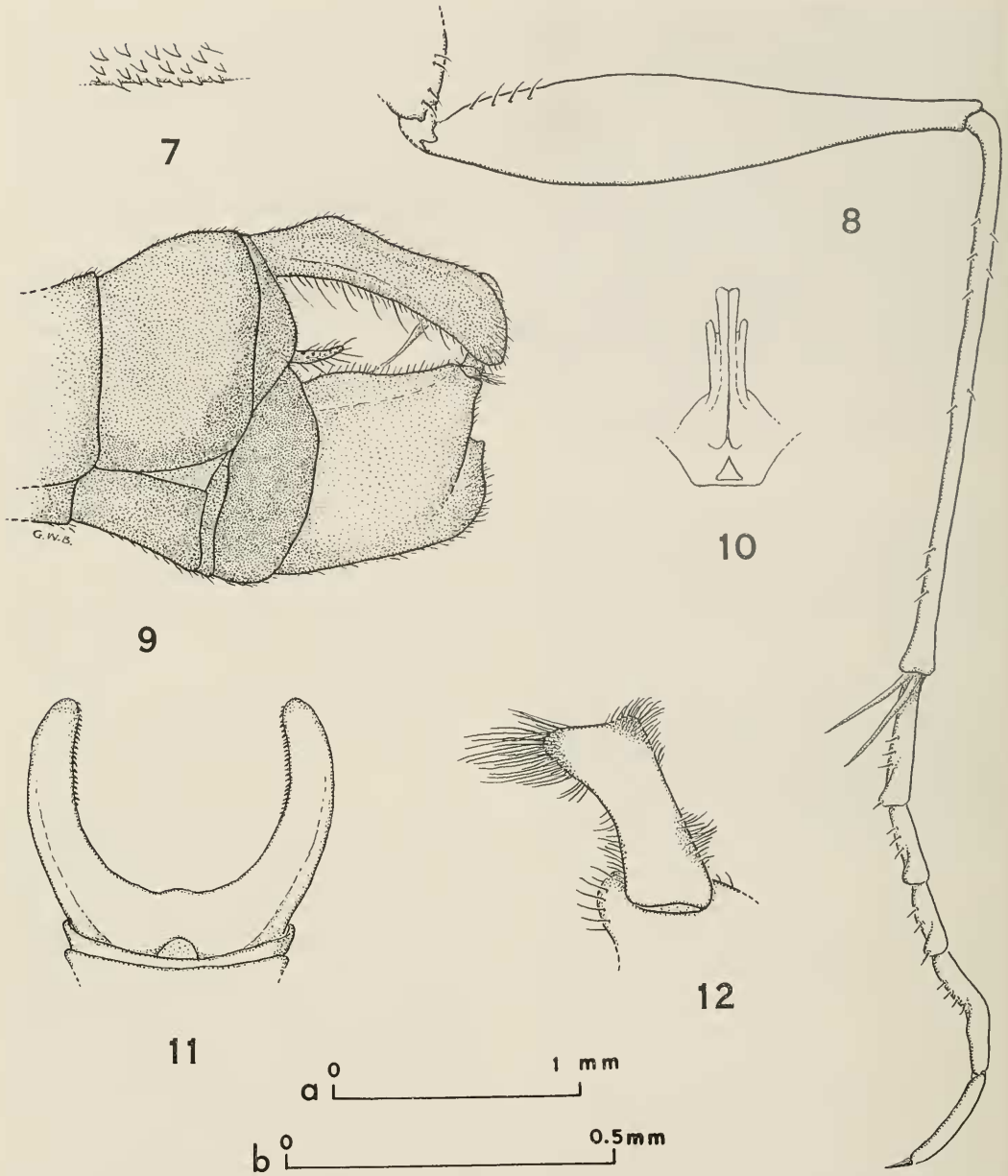
Wings (Fig. 1) faintly tinged with yellowish, stigma light brown; diffuse light yellowish brown clouding at ORs, FRs, in costal and subcostal cells, along all three ranks of cross-veins, at wing apex and in basal one-third of wing. Sc ending slightly beyond level of FRs; Scv opposite FRs. Cross-veins in radial and medial fields in approximate transverse-diagonal alignment.

Abdomen of male: Terga 2–6 mahogany-colored (dark reddish brown), unevenly darker along posterior and lateral margins, with abundant short hairs, each arising from slightly raised spinule. Corresponding sterna nearly black. Terga 7–8 unevenly blackish brown; sterna black. Epiandrial lobes widely divergent (Fig. 11), only about as long as basistyles, their dorsal and ventral margins thickened and approximately parallel, apex rounded (Fig. 9), lobes light brown, with numerous spinules on most of surface, some bearing short hairs; longer hairs along lower margin, near apex and on inner surface; small, black, recurved spines on inner surface at apex and along upper margin. Cerci short, narrowing toward tip. Basistyles light brown with numerous setae longest and darkest posteriorly below base of aedeagus and along dorsal margin (Fig. 9). Dististyles conspicuous (Fig. 12), with dark setae in groups along anterior and posterior margins. Aedeagus (Fig. 10) short, thick in basal two-thirds, abruptly more slender toward apex; base flanked by strongly sclerotized penunci.

Measurements: Body length approximately 13.8 mm.; length of fore wing 13.3 mm.

Type.—Holotype, ♂, and only specimen, collected near Petlalcingo, Puebla, Mexico, on 21 August 1963, by F. D. Parker and L. A. Stange. The label indicates three miles north of Petlalcingo, but only a trail goes north from the town, into mostly desert habitat. The actual locality (later confirmed by Lionel Stange) is at a bridge on Highway 190, three miles northwest of the junction of this highway and a side road into Petlalcingo. The type was presented to the Snow Entomological Collection, Natural History Museum, University of Kansas, by Dr. Frank Parker.

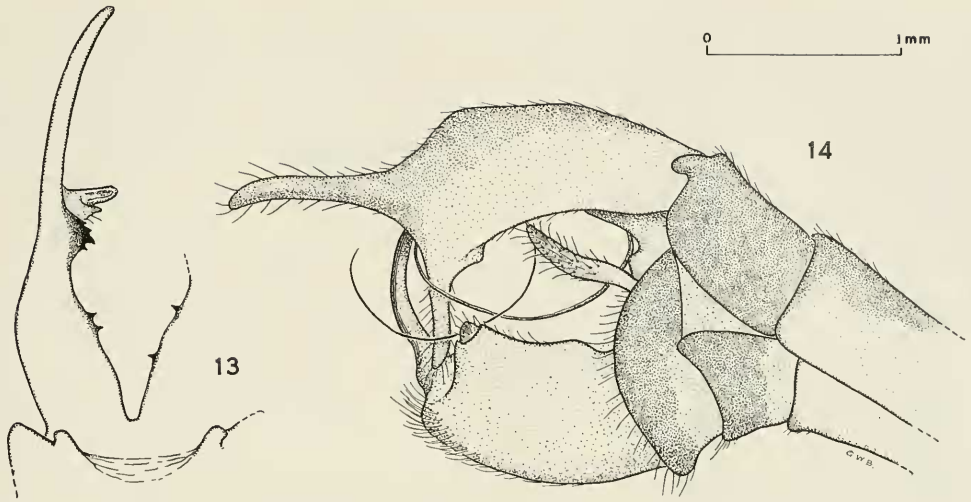
Discussion.—Chance discovery of a species (or individual) so different that it justifies placement in a separate genus is not without precedent in the Mecoptera. But in such cases, subsequent searches at or near the type locality have usually yielded additional specimens (e.g., *Orobittacus obscurus* Villegas and Byers, in central California). In the case of *Eremobittacus spinula-*



Figs. 7–12. *Eremobittacus spinulatus,* male holotype. 7, Detail of spinules on femur; note apical hairs at upper right and lower left. 8, Left hind leg, left lateral aspect. 9, Terminal abdominal segments, left lateral aspect. 10, Base of aedeagus, posterior aspect. 11, Epiandrial lobes, dorsal aspect. 12, Right dististyle, dorsal aspect. Scales: a—figs. 8–11; b—fig. 12.

tus, however, repeated collections made at the type locality and in the apparently correct season by myself and others have not rediscovered this species.

The reasons for placing this unusual bittacid in a genus separate from *Bittacus* have been discussed above. The specific name refers to the microscopic spinules on most of the body surface, a characteristic unique to this species.



Figs. 13–14. *Nannobittacus dactyliferus*, male paratype. 13, Right epiandrial lobe (and part of left), dorsal aspect. 14, Terminal abdominal segments, right lateral aspect. Scale: both figures.

Nannobittacus dactyliferus Byers, New Species
(Figs. 2, 13–14)

Description.—Based on 2 ♂, pinned.

Head: Occiput yellowish brown, vertex and frons above antennal bases black, granular; ocellar prominence black; lateral ocelli more than three times diameter of median ocellus; frons below antennal bases brown medially, paler next to eyes; clypeus glossy yellowish brown, labrum darker brown at sides; maxillary palp brown except apical segment paler; mandible and maxilla yellowish brown. Eyes large, protuberant, converging slightly below antennal bases. Antenna yellowish brown, with approximately 18 flagellomeres (indistinct beyond ninth); antennal length about 5.1 mm.

Thorax: Pronotum dark brown, with three transverse, rounded ridges; thick anterior ridge slightly upturned with low prominence at each side bearing one long, slender, hair-like seta, also shorter setae; short setae on middle and posterior ridges. Mesonotum glossy blackish brown with sparse, fine pale setae; metanotum only about half as long as mesonotum, blackish brown, glossy except D-shaped median area below mesoscutellum. Pleural surfaces, coxae and mera unevenly brownish gray, finely pubescent, with sparse yellowish setae longest and most dense on anterior coxae. Femora light grayish brown, darkened at apex; three or four black setae on outer surface. Tibiae and tarsi dark yellowish brown, setae black, tibial spurs nearly black but with short, yellowish hairs.

Wings (Fig. 2) lightly tinged with yellowish brown, veins brown, with undulating dark brown markings along costal border to wing apex, with subapical branch across outer cross-veins and reaching wing margin in outer cell M_1; five small, brownish transverse clouds in cell M between OM and FM. In fore wing, Scv opposite ORs, Sc joins C opposite FRs; one Pcv; 1A ending slightly beyond level of h; narrow, brownish borders around nygmata.

Abdomen of male: Terga 2–7 sordid dark yellowish brown anteriorly, dark brown posteriorly; corresponding sterna narrow, sordid yellowish brown except sternum 7 lighter yellowish brown and abruptly widened posteriorly. Tergum 8 brown throughout, with low, rounded dorsolateral lobe at each side; sternum 8 light brown. Epiandrial appendages (Fig. 14) brown along dorsal and apical margins, including slender, ter-

minal (posterior) prolongation which curves slightly mesad, pale brown ventrally and pale yellowish brown on slender ventral prolongation; slight protuberance on dorsal margin near mid-length, directed mesad, another, rounded and flattened, near base of ventral prolongation. Black spines on dorsal protuberance and on inner dorsal margin of epiandrial appendages (Fig. 13). Basistyles only about half as long as epiandrial appendages, brown dorsally grading into light brown ventrally and posteriorly. Dististyles inconspicuous, short, thick, rounded, strongly turned inward and forward. Cerci nearly as long as dorsal edge of basistyle, sharply pointed at apex, brown except pale near attachment to proctiger. Aedeagus long, coiled, unmodified near base, becoming filiform at approximately level of lower edge of epiandrial appendage.

Measurements: Body length 17.0–18.8 mm. (holotype 17.0 mm); length of fore wing 17.2–18.0 mm. (holotype 17.2 mm.).

Types.—Holotype, ♂, collected in Malaise trap, in Sucumbios, Ecuador (0.5°S, 76.5°W), elev. 270 m., 12–22 February 1995, by Peter Hibbs; specimen received by way of Dr. J. S. Ashe. Paratype ♂, in Malaise trap, Limoncocha, east of Coca, Napo Province, Ecuador, 22 May 1976, by David G. Young; received from Dr. C. P. Alexander, who had found it among Ecuadorian crane flies sent to him. Habitat for both these specimens is described as wet, lowland tropical forest (secondary forest in the case of the paratype).

Discussion.—In most characters, *Nannobittacus dactyliferus* is not strikingly different from other known species in its genus, but the epiandrial appendages (tergum 9) are conspicuously different from those in any other species. *Nannobittacus pollex* Byers and Roggero has a small, thumb-like projection from the lower margin of each epiandrial appendage, but this projection is less than one-fourth the length of those in *dactyliferus*. The name *dactyliferus* is derived from the long, slender prolongations of the epiandrial appendages (Latin *dactylus,* from Greek *dactylos* = finger; *fero* = to bear, carry). The possible function of the long, finger-like prolongations, the one at about a right angle to the other, is problematical.

Panorpa sentosa Byers, New Species
(Figs. 3, 15–19)

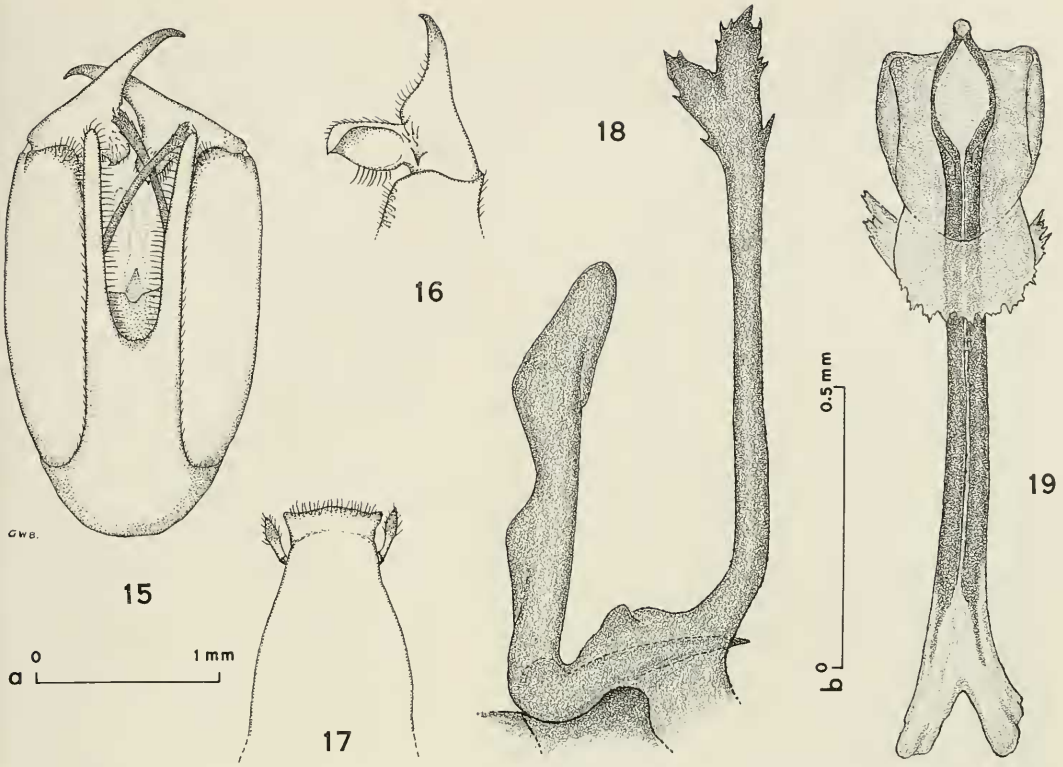
Description.—Based on 22 ♂ and 27 ♀, pinned, and 1 ♂, 2 ♀ in alcohol.

Head: Dorsum mostly shiny dark yellowish brown, slightly darker (or usually a brown spot) at each side of occiput adjacent to eye; ocellar prominence black, lateral ocelli about 1.5 times width of median ocellus. Rostrum yellowish brown, maxillary palps darker, dark brown on apical half of terminal segment. Antennal scape yellowish brown, pedicel brown, flagellum brownish black to black, with 32–36 flagellomeres in male (holotype 32 and 33), 33–36 in female (allotype 36). Antennal length, male, about 9.0 mm., female about 7.8–8.0 mm.

Thorax: Pronotum shiny dark brown except yellowish brown along mid-line and widening toward rear; 5–6 black setae along anterior margin on each side. Mesonotum and metanotum with broad, pale yellowish brown median stripe, brown at sides, nearly black just anterior to bases of fore wings; setae numerous, short, dark. Pleural surfaces, coxae and mera unevenly yellowish brown with scattered setae longest and most numerous on anterior surfaces of coxae. Femora, tibiae and tarsi yellowish brown, tibial setae black, fifth tarsomere dark brown.

Wings (Fig. 3) lightly tinged with yellowish brown; spots light brown, no complete bands; spots at ORs, FRs, from proximal end of stigma to fork of R_{4+5} or to M_1, outer end of stigma across fork of R_{2+3} to R_4, in cell 1st R_1, second cell M_3, cell M_4 and second cell Cu_1, in outermost radial and medial cells at wing margin, and along outer cross-veins, but variable.

Abdomen of male: Terga 2–5 light yellowish brown with short, pale setae; sterna



Figs. 15–19. *Panorpa sentosa*, paratypes. 15, Genital bulb of male, ventral (posterior) aspect. 16, Left dististyle, male, mesal aspect. 17, Ninth abdominal tergum, male, dorsal aspect. 18, Aedeagus and parameres, male, left lateral aspect. 19, Genital plates of female, ventral aspect (posterior end at top). Scales: a—figs. 15–17; b—figs. 18–19.

2–5 slightly paler. Segments 6–9 yellowish brown. Notal organ comprising broadly rounded, mid-caudal margin of tergum 3 with short, downcurved yellow setae, and sharp, strongly sclerotized peg on anterior tergum 4. Posterodorsal surface of segment 6 glabrous and slightly depressed (genital bulb "closes" against this area). Segments 7 and 8 short, 1.5–2 times as long as their diameter. Tergum 9 (Fig. 17) expanded at apex, lateral corners acute, caudal margin slightly rounded, nearly truncate; cerci distinctly two-segmented. Sternum 9 (Fig. 15) prolonged to nearly half length of basistyles, then separated into slender hypovalves that extend slightly beyond basistyles. Outer margin of each dististyle slightly concave, apex moderately curved, strongly sclerotized; basal cup greatly prolonged ventrad (Fig. 16), its blunt apical margin with single small tooth in most individuals; blackened, acute spine near base. Aedeagus (Fig. 18) with undivided ventral and dorsal parameres, dorsal ones compressed, somewhat spatulate, rounded at apex. Ventral parameres well sclerotized, rod-like through most of their length, extending beyond ends of basistyles and projecting ventrad between hypovalves, each deflected slightly laterad near base; apex variable, generally of two short, flat, expanded arms with spinose margins, often with a few setae. Ventral and dorsal valves small, concealed between bases of parameres in lateral aspect.

Abdomen of female: Terga shiny yellowish brown to light brown; sterna 2–5 slightly paler than corresponding terga; setae pale; cerci black. Subgenital plate broadly rounded posteriorly, with small median point in some individuals, slightly rounded

at sides, keeled along ventral midline. Posterior margin of apical genital plate (Fig. 19) nearly transverse, lateral edges curved ventrad; basal plate indistinct, only weakly sclerotized; axial portion greatly elongated, densely sclerotized through most of its length, anterior apodemes short, pale.

Measurements: Body length, male, about 7.1–9.2 mm. (holotype 8.8 mm.); female about 7.3–9.2 mm. (allotype 9.2 mm.). Length of fore wing, male, 8.7–11.1 mm. (holotype 10.4 mm.); female, 10.3–11.2 mm. (allotype 10.5 mm.).

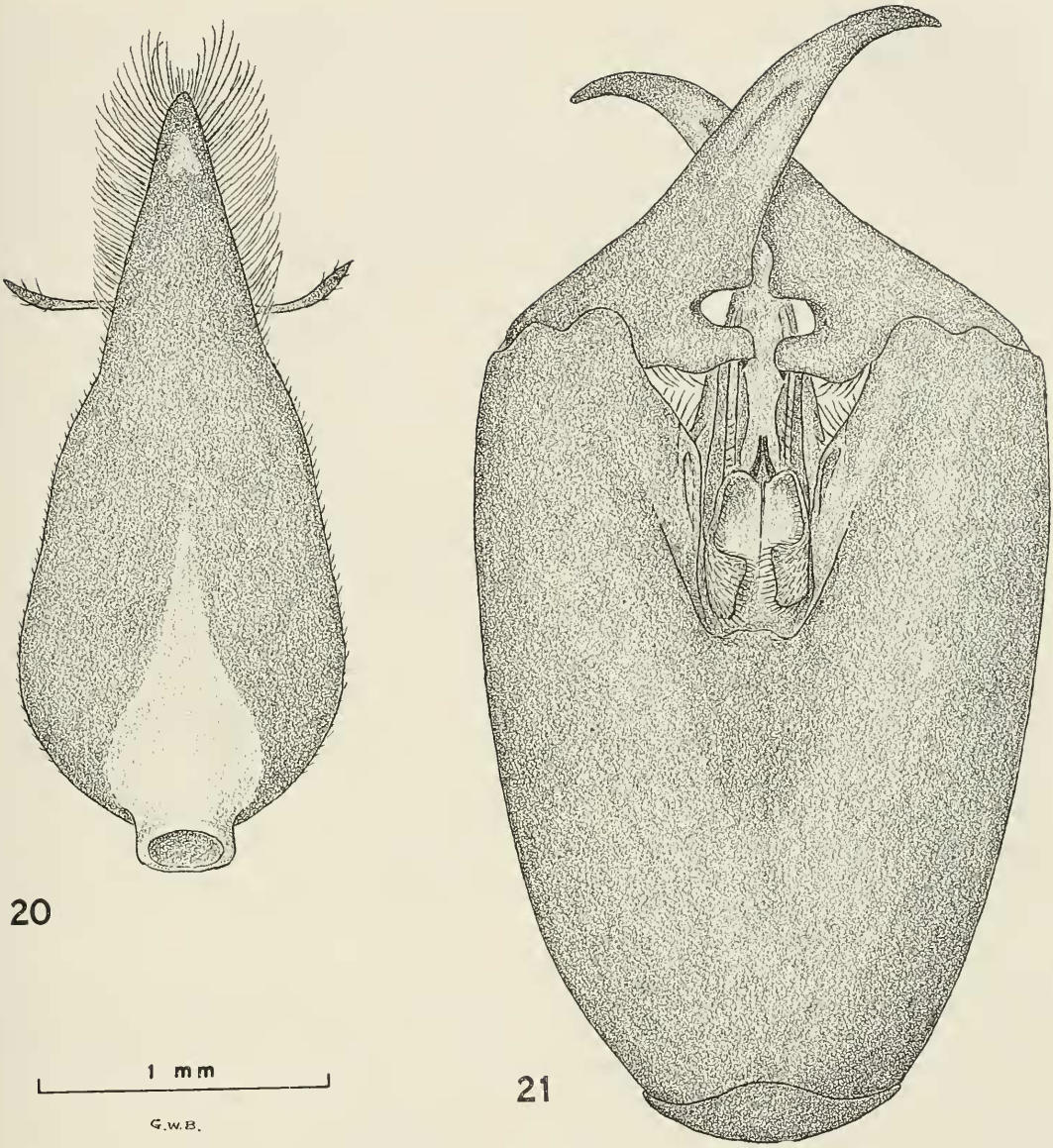
Types.—Holotype, ♂, allotype, two ♂ and three ♀ paratypes collected 14.9 mi. (24 km.) west of El Naranjo, San Luis Potosí, Mexico, on 26 August 1972, by G. W. Byers (field catalogue San Luis Potosí No. 15) and A. R. Thornhill. Additional paratypes, from San Luis Potosí: 14 mi. west of El Naranjo, 21 June 1971, N. D. Penny (3 ♂, 5 ♀); 15 mi. west of El Naranjo, 5 July 1971, N. D. Penny (7 ♂, 6 ♀); Hwy. 70, km. 82, along road to microwave tower Microondas Tortugas, 20 July 1988, C. L. Smith (3 ♂, 4 ♀); 16 mi. west of El Naranjo, 3500 ft., 8 September 1992, Wes Bicha (4 ♂, 1 ♀) and 9 Sept. 1992 (2 ♂, 7 ♀); from Tamaulipas, Rancho del Cielo, 3800 ft., 8 mi. west of Gomez Farias, 24–29 July 1971, G. E. and K. E. Ball (3 ♂, 4 ♀). Specimens collected by C. L. Smith are from the collection of the University of Georgia, Athens; those collected by Wes Bicha are in his collection.

Discussion.—Habitat at the type locality was forest of various oaks and a few other kinds of trees, beside Highway 80, 14.9 miles by road west of El Naranjo (1.6 miles below summit of pass and about 31 miles, or 49.5 km., by road west of Antiguo Morelos). Branches of all large trees bore numerous epiphytic bromeliads, mosses and liverworts; the undergrowth included woody shrubs up to two meters in height and herbaceous plants a meter or less high. Elevation 4000 feet (1220 m.); temperature 68°F; weather 100% cloudy, with rain ending collecting at 10:40 a.m. This is one of a very few localities in Mexico where *Panorpa* has been found lower than 5000 feet (1524 m.), perhaps because this is one of the northernmost places in Mexico where the genus has been found.

Norman D. Penny discovered the species, and information about its occurrence was passed to Byers and from him to Wes Bicha. Cecil Smith's finding it was an independent event.

The shape of sternum 9 and its hypovalves and the projecting ventral parameres with spinose apices make males of *Panorpa sentosa* readily recognizable. It is the terminal structure of the ventral parameres that gives the species its name (Latin *sentosa* = thorny). The unique tergum 9 is often not easily seen in pinned specimens; three other Mexican species of *Panorpa,* in the *involuta* group (Byers 1996), have the ninth tergum with approximately transverse posterior margin. In size and wing maculation *P. sentosa* somewhat resembles *P. mucronata* Byers, known only from Hidalgo, but the characters mentioned will easily differentiate males of these species. Females also can be readily recognized by the shape of the subgenital plate, which is short, broad, ventrally keeled and with a broadly rounded posterior margin in *sentosa* but unusually long and narrowly rounded posteriorly in *mucronata.*

Panorpa sentosa is a puzzling species because of the male's long ventral parameres that project conspicuously from within the genital bulb and have a complicated apex with numerous thorn-like points on the margin. In males of all other Mexican species, the ventral parameres have a simple apical margin that may be pointed or blunt but not irregularly jagged. Also, except in *P. sentosa,* the ventral parameres are shorter than the dorsal parameres, or in those species with two-branched ventral parameres the ventral branch is conspicuously shorter than either the dorsal branch or the dorsal parameres. When the ventral parameres project from the genital bulb, only their apices can be seen in lateral as-



Figs. 20–21. *Panorpa truncata*, male, paratype. 20, Ninth abdominal tergum, dorsal aspect. 21, Genital bulb, ventral (posterior) aspect, showing truncated ninth sternum. Scale: both figures.

pect, in other species, as contrasted to half their length projecting ventrad in *P. sentosa.*

Panorpa truncata Byers, New Species
(Figs. 4, 5, 20–26)

Description.—Based on 36 ♂, 39 ♀ pinned, and 3 ♂, 4 ♀ preserved in alcohol.

Head: Occiput, vertex and frons including ocellar prominence shiny black with sparse, very short, pale hairs on much of surface; clypeus shiny dark yellowish brown, labrum unevenly brown; maxillary palps yellowish brown, mandibles and maxillae brown. Scape and pedicel dark brown; flagellum mahogany brown basally, grading into black; 42–45 flagellomeres in male (holotype 44), 41–44 in female. Antennal

length about 11–13 mm. in male, 11–12 mm. in female.

Thorax: Pronotum mostly black, dull yellowish brown medially on posterior transverse ridge, with very short, pale hairs; anterior margin turned upward, with 6–8 black setae and several shorter black hairs at each side. Mesonotum black at sides, light brown medially including scutellum; metanotum black at sides, more broadly light brown medially than mesonotum. Pleural surfaces, coxae and mera black with fine, short, whitish pubescence and sparse yellowish setae most dense on coxae and lower parts of mera. Fore and middle legs orange-brown on femora and tibiae, tarsi darker, fifth tarsomere black. Femur of hind leg dark orange-brown, tibia sordid yellowish brown, tarsus brown, darkening toward apex.

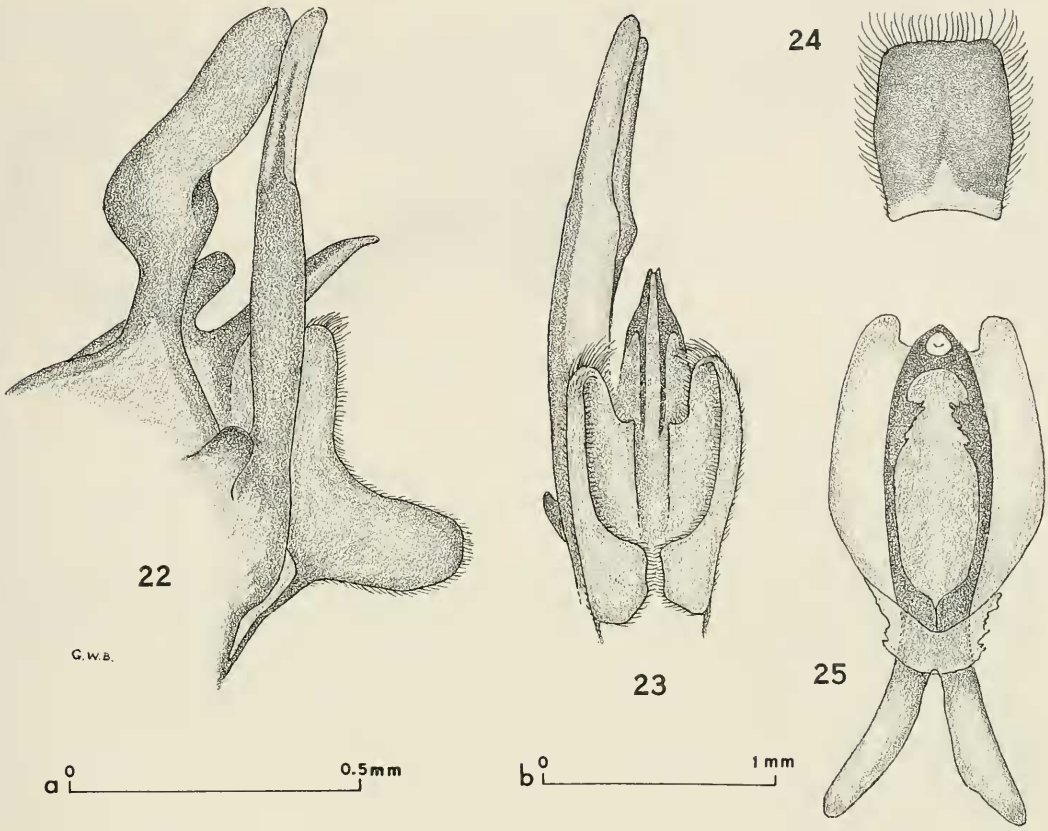
Wings tinged with yellowish brown, unmarked except for slightly darkened stigma, in male (Fig. 4), with dark brown apical band, from near end of R_2 to end of M_2 and to wing apex, and slightly darkened stigma, in female (Fig. 5). Veins R_2 and R_3 unbranched. Whitish thyridium at FM.

Abdomen of male: Segments 2–8 ferrugineous with short, pale yellowish hairs sparse on terga, more dense on sterna; hairs longer on sixth segment. Segments 7 and 8 each about as long as 6, much longer than more anterior segments. Notal organ a broad, truncate median lobe on hind margin of tergum 3, with downcurved yellowish hairs, and a low, blunt median process on tergum 4 with yellowish hairs directed cephalad. Segment 9 shiny black to brownish black except ferrugineous on petiole inserted into segment 8; setae brown to black. Ninth tergum (Fig. 20) elongate, narrowing posteriorly to acute apex, with long, black hairs along sides beyond slender, apparently single-segmented cerci; ferrugineous spot near apex. No hypovalves or other prolongations on ninth sternum (Fig. 21). Basistyles fused for more than half their length. Dististyles (Fig. 21) black basally, dark orange-brown in apical half; basal cup usually with blackened tooth on inner, dorsal margin. Aedeagus (Figs. 22, 23) with two-branched ventral parameres; ventral branch only weakly sclerotized, covered laterally with short hairs, its ventral prolongation curved slightly mesad; dorsal branch rod-like, darkly sclerotized at base, pale at apex. Dorsal parameres compressed, wide in lateral aspect, rounded at apex. Ventral valves acutely tipped, more darkly sclerotized along dorsal (upper) curvature than on lower side. Dorsal valves small, densely sclerotized, apically rounded.

Abdomen of female: Terga 2–5 unevenly dark ferrugineous to dark brown (probably some post-mortem effects involved), with short, pale setae; terga 6–8 orange-brown, 9 dark brown, 10 brown on posterior half, with long, black setae; cerci black. Sterna 2–5 yellowish orange to light ferrugineous, wide, with pale setae; 6–8 ferrugineous. Conspicuous laterotergites, attenuate anteriorly, rounded posteriorly, on segments 7 and 8. Subgenital plate (Fig. 24) broad with transverse or very broadly rounded caudal margin and long bordering hairs; mostly dark brown but abruptly paler at base. Genital plates (Fig. 25) with divergent anterior apodemes; apical plate white, only weakly sclerotized; extent of basal plate not evident.

Measurements: Body length, male, about 20.6–22.4 mm. (holotype 22.4 mm.); female, about 14.7–15.4 mm. (allotype 14.9 mm.). Length of fore wing, male, 16.6–17.4 mm. (holotype 17.4 mm.); female, 16.3–17.1 mm. (allotype 16.3 mm.).

Types.—Holotype, ♂, allotype and 19 ♂, 23 ♀ paratypes collected near Highway 110, 5.4 km. by road north of Mazamitlá (measured from major road junction at north edge of the town), Jalisco, Mexico, 10 July 1985, at elevation 6890 feet (2120 m.), by George W. Byers (field catalogue Jalisco no. 5). One ♂, two ♀ paratypes from nearly same locality (a few hundred meters farther north), collected by David K. Faulkner, 12 July 1982, in the Natural History Museum, San Diego, California; 18 ♂ and 17 ♀ paratypes collected 3.6 mi. (5.8



Figs. 22–25. *Panorpa truncata*, paratypes. 22, Aedeagus and parameres, male, left lateral aspect. 23, Aedeagus, ventral aspect. 24, Subgenital plate of female, ventral aspect (posterior end at top). 25, Genital plates of female, ventral aspect (posterior end at top). Scales: a—figs. 22–23, 25; b—fig. 24.

km.) south of Mazamitlá, 26 and 29 August 1989, by Wes Bicha, in his collection.

The type locality, about 30 km. south of Laguna de Chapala, is a small valley in sparse oak woods (trees 10 to 13 m. high), with shrubs 1–2 m. high, lower herbaceous plants and grasses; slope of valley floor about 15–20 degrees.

Discussion.—This species was discovered by Dr. David K. Faulkner of the Natural History Museum, San Diego. In 1984, he sent me one male and two females for identification. The first thing one notices about *Panorpa truncata,* apart from its large size, contrasting coloration (Fig. 26), and the sexual difference in wing coloration, is that there is no prolongation of the male's ninth sternum, which in other species is usually divided into separate hypovalves. Males of every other species of Panorpidae in the world possess this structure. It has proved to be useful in taxonomy because it varies in shape from species to species but is fairly constant within a species. Describing Faulkner's obviously new species based upon what appeared to be a monstrosity seemed unwise. Accordingly, I made a brief trip to Jalisco the next summer (1985) to find additional males. And all of them lacked hypovalves. The species takes its name from the absence of these sternal prolongations (Latin *truncata* = cut off, or deformed, mutilated). I have never determined the function of hypovalves in male panorpids but assume they are tactile; clearly *P. truncata* has no need of them.

Fig. 26. Male *Panorpa truncata,* left lateral aspect. Drawing by Anne Musser.

Males of *P. truncata,* when inactive, hold their wings roof-like above the body and the tip of the abdomen curved forward so as to be virtually concealed by the wings. Females, more active than males, hold their black-tipped wings more out to the sides. Both males and females were often (usually, if undisturbed) seen resting in a vertical position, such as clutching a plant stem or tall grass blade. When alarmed, females flew higher than males into low shrubs and herbaceous vegetation.

At the time of these observations, two males of a second (still unnamed) species, somewhat smaller than *P. truncata* and with orange body including orange genital bulb, were collected. These had well-developed hypovalves.

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